

WHAT IS CLAIMED IS:

1. A facial image recognition apparatus  
comprising;

5 a plurality of illuminations radiating light  
toward the face of a human recognition object,  
a camera for photographing a facial image of the  
human recognition object toward which the light from  
the plurality of illuminations is radiated,

10 a feature value extraction section for extracting  
a feature value of the face of the human recognition  
object from a facial image photographed by the camera,  
and

15 a recognition section for collating the feature  
value extracted by the feature value extraction section  
with a standard feature value registered in advance so  
as to recognize a facial image of the human recognition  
object.

20 2. The facial image recognition apparatus as  
set forth in claim 1, wherein the plurality of  
illuminations are composed of a first illumination  
for radiating light toward the face of the human  
recognition object and a second illumination for  
radiating light toward the face of the human  
recognition object, said first illumination is  
25 installed in an upper right diagonal part, an upper  
left diagonal part, a front right diagonal part, or  
a front left diagonal part of the camera, taken in the

00044012-032204

direction that the human recognition object looks, and said second illumination is installed below the camera.

3. The facial image recognition apparatus as set forth in claim 2, wherein the illuminance of the light radiated from the first illumination is greater than that of the light radiated from the second illumination.

4. The facial image recognition apparatus as set forth in claim 2, wherein the total value of the illuminance of the light radiated from the first illumination and the illuminance of the light radiated from the second illumination is greater than the illuminance of the light other than the light from the first and second illuminations radiated to the human recognition object.

5. The facial image recognition apparatus as set forth in claim 1, further comprising an information input section for inputting information related to the human recognition object, wherein the recognition section searches a feature value corresponding to the information inputted by the information input section from the standard feature value registered in advance and collates the searched feature value with the feature value extracted by the feature value extraction section so as to recognize a facial image of the human recognition object.

6. The facial image recognition apparatus as set

Patented Feb 24 1964

forth in claim 1, further comprising an outer light interruption section for interrupting light other than the light from the plurality of illuminations radiated to a facial part of the human recognition object.

5           7. The facial image recognition apparatus as set forth in claim 1, further comprising a display section for displaying the facial image photographed by the camera and displaying information showing an appropriate size of a facial image.

10           8. The facial image recognition apparatus as set  
forth in claim 2, wherein

the first illumination is installed in a front  
right diagonal part or a front left diagonal part of  
the camera, taken in the direction that the human  
15 recognition object looks, and

the camera is installed below a position of the face of the human recognition object so as to photograph a facial image of the human recognition object in an upward direction.

20           9. The facial image recognition apparatus as set  
forth in claim 1, wherein

the plurality of illuminations sequentially operate in a predetermined order and time interval,

the camera photographs facial images of the human  
recognition object one after another by synchronizing  
sequential operations of the plurality of  
illuminations,



5  
10

15

20

25

the facial image registration section further

comprises a first display section for displaying  
a facial image photographed by the first camera, and  
the facial image recognition section further  
comprises a second display section for displaying  
5 a facial image photographed by the second camera.

13. A pass control apparatus recognizing a facial  
image of a passenger to control a pass of the  
passenger, said pass control apparatus comprising

10 a plurality of illuminations radiating light  
toward the face of the passenger,

a camera for photographing a facial image of the  
passenger toward which the light from the plurality of  
illuminations is radiated,

15 a feature value extraction section for extracting  
a feature value of the face of the passenger from  
a facial image photographed by the camera,

a recognition section for collating the feature  
value extracted by the feature value extraction section  
with a standard feature value registered in advance so  
20 as to recognize a facial image of the passenger, and

a pass control section for controlling a pass of  
the passenger according to a recognition result by the  
recognition section.

25 14. The pass control apparatus as set forth in  
claim 13, wherein the plurality of illuminations are  
composed of a first illumination for radiating light  
toward the face of the passenger and a second

00014012.022004

illumination for radiating light toward the face of the passenger, said first illumination is installed in an upper right diagonal part, an upper left diagonal part, a front right diagonal part, or a front left diagonal part of the camera, taken in the direction that the passenger looks, and said second illumination is installed below the camera.

15. The pass control apparatus as set forth in claim 13, further comprising an information input section for inputting information related to the human recognition object, wherein the recognition section searches a feature value corresponding to the information inputted by the information input section from the standard feature value registered in advance and collates the searched feature value with the feature value extracted by the feature value extraction section so as to recognize a facial image of the human recognition object.

16. The pass control apparatus as set forth in claim 13, further comprising an outer light interruption section for interrupting light other than the light from the plurality of illuminations radiated to a facial part of the passenger.

17. The pass control apparatus as set forth in claim 13, further comprising a display section for displaying the facial image photographed by the camera and displaying information showing an appropriate size

of a facial image.

18. The pass control apparatus as set forth in claim 14, wherein

5 the first illumination is installed in a front right diagonal part or a front left diagonal part of the camera, taken in the direction that the human recognition object looks, and

10 the camera is installed below a position of the face of the human recognition object so as to photograph a facial image of the human recognition object in an upward direction.

19. The pass control apparatus as set forth in claim 13, wherein

15 the plurality of illuminations sequentially operate in a predetermined order and time interval,

the camera photographs facial images of the passenger one after another by synchronizing sequential operations of the plurality of illuminations,

20 the feature value extraction section extracts feature values of the face of the passenger from a plurality of facial images sequentially inputted from the camera, respectively, and

25 the recognition section collates a plurality of feature values extracted by the feature value extraction section with a standard feature value registered in advance, respectively, so as to recognize a facial image of the passenger.

Patent Office



20. The pass control apparatus as set forth in claim 19, further comprising a registration section for registering the plurality of feature values extracted by the feature value extraction section as standard feature values, respectively, at a time of registration of a facial image, wherein the recognition section collates a plurality of feature values extracted by the feature value extraction section with a plurality of standard feature values registered by the registration section, respectively, at a time of collation of a facial image, so as to recognize a facial image of the passenger.

21. A pass control apparatus recognizing a facial image of a passenger to control a pass of the passenger, said pass control apparatus comprising a facial image registration section for performing registration processing of a facial image and a facial image recognition section connected to the facial image registration section to perform recognition processing of a facial image, wherein

the facial image registration section comprises a plurality of first illuminations radiating light toward the face of a human registration object, a first camera for photographing a facial image of the human registration object, a first feature value extraction section for extracting a feature value of the face of the human registration object from a facial image

photographed by the first camera, and a memory section for storing a feature value extracted by the first feature value extraction section as a standard feature value, and

5           the facial image recognition section comprises a plurality of second illuminations radiating light toward the face of the passenger, a second camera for photographing a facial image of the passenger, a second feature value extraction section for extracting a feature value of the face of the passenger from a facial image photographed by the second camera, a recognition section for collating a feature value extracted by the second feature value extraction section with a feature value stored in the memory section of the facial image registration section so as to recognize a facial image of the passenger, and a pass control section for controlling a pass of the passenger according to a recognition result by the recognition section.

20           22. The pass control apparatus as set forth in claim 21, wherein

          the facial image registration section further comprises a first display section for displaying a facial image photographed by the first camera, and

25           the facial image recognition section further comprises a second display section for displaying a facial image photographed by the second camera.

TOP SECRET

23. The pass control apparatus as set forth in claim 13, further comprising a record device for recording an image photographed by the camera.

24. The pass control apparatus as set forth in  
5 claim 23, wherein

the recognition section sends a recognition result to the record device, and

the record device records a recognition result by the recognition section along with an image  
10 photographed by the camera.

25. The pass control apparatus as set forth in claim 13, further comprising an image transfer section for transferring an image photographed by the camera to a display device for monitoring.

26. A facial image recognition apparatus  
15 comprising

a camera installed so that a human recognition object positions oneself on a floor face having at least one or more differences in elevation and  
20 photographing a facial image of the human recognition object positioning oneself on a floor face of a height according to the height of the human recognition object,

a display section for displaying a facial image  
25 of the human recognition object photographed by the camera,

a feature value extraction section for extracting

102200-2104150

a feature value of the face of the human recognition object from a facial image photographed by the camera, and

5 a recognition section for collating the feature value extracted by the feature value extraction section with a standard feature value registered in advance so as to recognize a facial image of the human recognition object.

10 27. The facial image recognition apparatus as set forth in claim 26, further comprising an information input section for inputting information related to the human recognition object, wherein the recognition section searches a feature value corresponding to the information inputted by the information input section  
15 from the standard feature value registered in advance and collates the searched feature value with the feature value extracted by the feature value extraction section so as to recognize a facial image of the human recognition object.

20 28. The facial image recognition apparatus as set forth in claim 26, further comprising a posture guide for supporting a hand in a state wherein the human recognition object bends one's lower back, wherein the camera photographs in an upward direction a facial  
25 image of the human recognition object in a posture in which one's hand is supported by the posture guide.

29. The facial image recognition apparatus as set

09844012 032204  
102220 21041850

5 image of the human recognition object in a posture in  
which one's hand is supported by the posture guide, and  
the display section is installed so that the human  
recognition object can look at a display screen in a  
state wherein the face of the human recognition object  
0 whose hand is supported by the posture guide faces  
downward.

30. The facial image recognition apparatus as set forth in claim 29, wherein the display section is installed so that an angle of the display screen displayed for the human recognition object with respect to the floor face becomes more obtuse than the angle of the photographing direction of the camera with respect to the floor face.

31. The facial image recognition apparatus as set forth in claim 26, further comprising an infrared light interruption section for interrupting an infrared wavelength region of natural light, wherein the camera has a sensitivity only in the infrared wavelength region and photographs a facial image of the human recognition object in a state wherein an infrared wavelength region of the outer light is interrupted by the infrared light interruption section.

32. The facial image recognition apparatus as set forth in claim 31, further comprising an infrared illumination for radiating light in an infrared wavelength region toward the human recognition object.

5 33. A pass control apparatus recognizing a facial image of a passenger to control a pass of the passenger, said pass control apparatus comprising

10 a camera installed so that the passenger positions oneself on a floor face having at least one or more differences in elevation and photographing a facial image of the passenger positioning oneself on a floor face of a height according to the height of the passenger,

15 a display section for displaying a facial image of the passenger photographed by the camera,

a feature value extraction section for extracting a feature value of the face of the passenger from a facial image photographed by the camera,

20 a recognition section for collating the feature value extracted by the feature value extraction section with a standard feature value registered in advance so as to recognize a facial image of the passenger, and

25 a pass control section for controlling a pass of the passenger according to a recognition result by the recognition section.

34. The pass control apparatus as set forth in claim 33, further comprising an information input

TOP SECRET

section for inputting information related to the passenger, wherein the recognition section searches a feature value corresponding to the information inputted by the information input section from the standard  
5 feature value registered in advance and collates the searched feature value with the feature value extracted by the feature value extraction section so as to recognize a facial image of the passenger.

35. The pass control apparatus as set forth in  
10 claim 33, further comprising a posture guide for supporting a hand in a state wherein the passenger bends one's lower back, wherein the camera photographs in an upward direction a facial image of the passenger in a posture in which one's hand is supported by the  
15 posture guide.

36. The pass control apparatus as set forth in  
claim 33, further comprising a posture guide for supporting a hand in a state wherein the passenger bends one's lower back, wherein the camera photographs  
20 in an upward direction a facial image of the passenger in a posture in which one's hand is supported by the posture guide, and the display section is installed so that the passenger can look at a display screen in a state wherein the face of the passenger whose hand is  
25 supported by the posture guide faces downward.

37. The pass control apparatus as set forth in claim 36, wherein the display section is installed so

20250220

5           38. The pass control apparatus as set forth in  
claim 33, further comprising an infrared light  
interruption section for interrupting an infrared  
wavelength region of natural light, wherein the camera  
has a sensitivity only in the infrared wavelength  
0   region and photographs a facial image of the passenger  
in a state wherein an infrared wavelength region of the  
outer light is interrupted by the infrared light  
interruption section.

39. The pass control apparatus as set forth in  
claim 38, further comprising an infrared illumination  
for radiating light in an infrared wavelength region  
toward the passenger.